Waquoit Bay National Estuarine Research Reserve Management Plan 2006-2011

Volume II: Appendices

A: Public Comments on Draft Management Plan

B: Federal Consistency Certification

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
251 Causeway Street, Suite 800, Boston, MA 02114-2136
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October 17, 2005

Christine Gault, Reserve Manager
Waquoit Bay National Estuarine Research Reserve
P.O. Box 3092
Waquoit, MA 02536

RE: Federal Consistency Certification: WBNERR Management Plan

Dear Ms. Gault:

The Massachusetts Office of Coastal Zone Management (CZM) has completed its review of the proposed Waquoit Bay National Estuarine Research Reserve Management Plan.

We concur with your certification and find that the plan as proposed is consistent with the CZM enforceable program policies.

If the above-referenced plan, which has received this concurrence from CZM, is modified in any substantive manner or is noted to be having effects on the coastal zone or its uses that are substantially different than originally proposed, please submit an explanation of the nature of the change to this Office pursuant to 301 CMR 21.17 and 15 CFR 930.66.

Thank you for your cooperation with CZM.

Sincerely,

FOR SSC

Susan Snow-Cotter
Director

SSC/th

Cc: Truman Henson, Jr.,
CZM Cape & Islands Regional Coordinator

C: WBNERR Active Research and Monitoring Project List for 2005 (Updated 8/3/2005)

Internal Projects

Project	Institution / Organization	Principle Contacts
Bay Watchers: Citizen Water Quality Monitoring (since 1993, currently 8 sites)	***WBNERR***	***MK. Fox*** C. Weidman
Coast Watchers: Citizen Shoreline Change Monitoring (since 2000, 4 times /yr, 75 sites / 3 miles of beach)	WBNERR	C. Weidman H. Tschaekofske MK. Fox
NERR SWMP-Water Quality (since 1996, 1/2 hrly continuous records at 4 sites currently)	WBNERR	H. Tschaekofske C. Weidman
NERR SWMP-Meteorology (since 2002, 15-min continuous records)	***WBNERR***	H. Tschaekofske MK. Fox C. Weidman
NERR SWMP-Nutrients (since 2002, monthly records at 4 sites currently)	WBNERR	MK. Fox C. Weidman
NERR SWMP-Bio-mapping of the Reserve's salt marsh vegetation, seaweed and seagrass (2004-2005 initial year of project – to be repeated every 3-5 yrs)	WBNERR WBNERR WBNERR WBNERR Mashpee Mass. DEP	A. Reynolds H. Tschaekofske C. Weidman B. Annett R. York C. Costello
Restricted Salt Marsh Monitoring (Salt marsh restoration project)	WBNERR Mass. CZM	B. Annett B. Carlisle
Salt Marsh Fish Survey	WBNERR	B. Annett

Other NOAA Estuarine Research Division-Supported Projects (NERR-Graduate Research Fellowships and CICEET projects)

Project	Institution / Organization	Principle Contacts
Designing effective coastal outreach programs	URI	B. Barak (Grad. Fellow-Waquoit Bay NERR)
Stable isotope signatures in saltmarsh cordgrass	BUMP / MBL BUMP/MBL	E. Kinney (Grad. Fellow-Waquoit Bay NERR) I. Valiela
Plant-herbivore interactions: latitudinal variation and impacts of climate change	University of Houston	C.-K. Ho (Grad. Fellow-ACE NERR)
Web Framework for comparative N-loading models (CICEET project)	BUMP / MBL	J. Bowen (Grad Fellow- Jobos Bay

	BUMP / MBL	NERR) I. Valiela
Shellfish Aquaculture and Nitrogen-load mitigation (CICEET project)	WHOI WHOI / USGS WHOI-SG / Barnstable Cty WHOI	H. Kite-Powell K. Kroeger B. Walton D. Angel
Designing a new efficient onsite denitrification septic system (CICEET project)	UMASS-Dartmouth UMASS-Amherst	S. Sengupta S. J. Ergas
Fecal coliform /colliphage RNA monitoring (CICEET project)	Univ. of North Carolina Univ. of North Carolina	G. Lovelace M. Sobsey
Reactive barrier technology for reducing estuarine N-loading (CICEET project)	Ecosystems Center / MBL Ecosystems Center / MBL Lombardo Assoc.	K. Foreman J. Valino P. Lombardo
Rapid assessment of anthropogenic copper pollution in estuaries (CICEET project)	WHOI Univ. of Maryland	J. Moffet R. Thompson
Synthesis of SWMP data for ASSETS eutrophication assessment of the Northeast Region NERRs	NOAA Wells NERR FB Environmental	S. Bricker C. Dalton F. Dillon

Collaborative Projects

Project	**Institution / Organization**	**Principle Contacts**
Creating a 30-year faunal database from the Mass. Div. of Fisheries Young of the Year Winter Flounder seine survey in Waquoit Bay and Cape Cod south coast estuaries	WBNERR MDMF WBNERR	E. Shields V. Manfredi C. Weidman
Falmouth Buzzard's Bay Shoreline Study	Falmouth CRWG USGS WBNERR WBNERR	J. Tucker, Chair R. Thieler C. Weidman A. Reynolds
Sedimentological processes and evolution of Waquoit Bay	WBNERR WHOI WHOI	C. Weidman M. Charette J. Donnelly
Shelf –estuarine interactions	***WHOI*** WHOI WBNERR	***S. Gallagher*** R. Beardsley C. Weidman
Trace elements in *M. mercenaria* shells	WHOI WHOI WHOI WBNERR	A. Rago M. Charrette S. Thorrold C. Weidman

N^{15} in *M. mercenaria* shells	Univ. Maine-Machias WBNERR/WHOI	R. Carmichael C. Weidman
Monitoring changes in endangered coastal plain plant populations: *Agulinus , Liatris*	MDFW MDFW WBNERR	P. Somers S. Brownback B. Annett

External Projects

Project	**Institution / Organization**	**Principle Contacts**
Macroalgae and Nitrogen-loading	BUMP / MBL BUMP / MBL	S. Fox I. Valiela
The effects of N-loading on phytoplankton populations	BUMP / MBL BUMP / MBL	G. Tomasky I. Valiela
Near-source atmospheric deposition as a nitrogen source to coastal lagoons	Cornell Univ. Cornell Univ. Cornell Univ.	B. Howarth N. Bettez E. Davidson
Geochemical transformations in subterranean estuaries: reactions, rates, and fluxes	WHOI WHOI	M. Charette A. Mulligan
Mechanisms of dinitrogen production in coastal permeable sediments	WHOI WHOI WHOI WHOI	M. Charette K. Kroeger K. Casciotti K. Edwards
Developing the Concept of a Coastal Groundwater Observatory	WHOI WHOI	M. Charette A. Mulligan
Macroalgal blooms	***BUMP / MBL*** BUMP / MBL	***M. Teichberg*** I. Valiela
Eelgrass dynamics	***BUMP / MBL*** ***BUMP / MBL***	Y. Olsen I. Valiela
Mapping storm-driven nearshore sediment transport	WHOI WHOI	B. Raubenheimer P. Shultz
Using seismic reflection to resolve the glacial history of Cape Cod, MA	Boston College	Matt Gruber
Body size variability of Spotted Salamanders across Massachusetts	UMASS-Lowell Oxbow Assoc.	S. Smyers
Eutrophication and seagrass assessment using a bio-optic approach	NOAA-CCFHA MDEP Smithsonian-ERC	W. J. Kenworthy C. Costello C. Gallegos
Coastal dune plant community structure	UMASS-Dartmouth	T. Rajaniemi

Acronym Key:

BUMP / MBL: Boston University Marine Program at the Woods Hole Marine Biological Laboratory
CICEET: Cooperative Institution for Coastal Environmental and Estuarine Technology
Falmouth CRWG: Town of Falmouth Coastal Resources Working Group
MDEP: Massachusetts Dept. of Environmental Protection
MDFW: Massachusetts Division of Fisheries and Wildlife
MDMF: Massachusetts Division of Marine Fisheries
NOAA: National Oceanic and Atmospheric Administration
NOAA-CCFHA: NOAA Center for Coastal Fisheries and Habitat Research
Smithsonian-ERC: Smithsonian Environmental Research Center
UMASS: University of Massachusetts
WBNERR: Waquoit Bay National Estuarine Research Reserve
WHOI: Woods Hole Oceanographic Institution
WHOI-SG: WHOI-Sea Grant

D: Land Stewardship Zoning Guidelines
Department of Conservation and Recreation

Revised Draft 8/15/05

Background

In July, 2003 state legislation established the Department of Conservation and Recreation (DCR), consisting of a Division of Urban Parks and Recreation, a Division of State Parks and Recreation, and a Division of Water Supply Protection. This legislation essentially merged the former Department of Environmental Management (DEM) and the Metropolitan District Commission (MDC). In addition, the legislation required the preparation of management plans for state parks, forests and reservations under the management of DCR (Chapter 21, Section 2F). This legislation states that management plans shall include guidelines for operation and land stewardship, provide for the protection and stewardship of natural and cultural resources, and shall ensure consistency between recreation, resource protection, and sustainable forest management.

As part of addressing this legislative requirement, land stewardship zoning guidelines will be incorporated into the development and implementation of DCR Resource Management Plans. These Land Stewardship Zoning Guidelines (Guidelines) represent a revision of the previous Land Stewardship Zoning system developed by Executive Office of Environmental Affairs (EOEA) agencies in the early 1990s, and which had been applied to the preparation of management plans for state parks, forests and reservations under the management of the former DEM.

The purpose of these revised Guidelines is to provide a general land stewardship zoning framework for the development of Resource Management Plans for all state reservations, parks and forests under the management of the DCR Divisions of Urban Parks and Recreation and State Parks and Recreation. The Guidelines do not apply to Division of Water Supply Protection (DWSP) properties because DWSP watershed planning has a separate legislative mandate and established planning procedures.

Overview of Guidelines

The Guidelines define three types of zones to address the legislative requirement to provide for the protection and stewardship of natural and cultural resources and to ensure consistency between recreation, resource protection, and sustainable forest management. The Guidelines are intended to provide a general land stewardship zoning framework that is flexible and that can guide the long-term management of a given DCR property or facility. The three zones may be supplemented with significant feature overlays that identify specific designated/recognized resource features (such as Forest Reserves, Areas of Critical Environmental Concern, or areas subject to historic preservation restrictions). DCR parks, forests and reservations are also subject to specific policy guidelines and/or performance standards (such as Executive Order No. 181 for Barrier Beaches) and applicable environmental laws and regulations of the Commonwealth.

Application of the three-zone system to a particular DCR park, forest or reservation is facilitated by the development and application of Geographic Information Systems (GIS) technology. GIS resource overlays provide a general screen whereby lands of special resource significance and sensitivity can be mapped and identified. General landscape features such as forested areas, wetlands, streams and ponds can also be mapped as part of this overlay approach. Further, additional data regarding recreational uses and developed facilities and sites can be added. This type of mapping and data collection, based on the best information currently available, provides the basis for subsequent analysis and ultimately the development and application of appropriate land stewardship zoning guidelines to a specific state park, forest or reservation.

Land Stewardship Zoning Guidelines provide a foundation for recommendations that will address resource stewardship and facility management objectives, and are intended to cover both existing DCR property or facility conditions and desired future conditions for that property or facility. Proposals for changing the Guidelines in a previously approved Resource Management Plan should be submitted to the DCR Stewardship Council for review and adoption.

Land Stewardship Zones

Zone 1

General Description

This zone includes unique, exemplary and highly sensitive resources and landscapes that require special management approaches and practices to protect and preserve the special features and values identified in the specific Resource Management Plan. Examples of these resources include rare species habitat identified by the Natural Heritage & Endangered Species Program as being highly sensitive to human activities, fragile archaeological or cultural sites, and unique or exemplary natural communities. Management objectives emphasize protecting these areas from potentially adverse disturbances and impacts.

General Management Guidelines

- Only dispersed, low-impact, non-motorized, sustainable recreation will be allowed provided that the activities do not threaten or impact unique and highly sensitive resources.
- Existing trails and roads will be evaluated to ensure compatibility with identified resource features and landscape, and will be discontinued if there are suitable sustainable alternatives. New trails may be constructed only after a strict evaluation of need and avoidance of any potential adverse impacts on identified resources. New roads may only be constructed to meet public health and safety needs or requirements; however, the project design and siting process must avoid any potential adverse impacts on identified resources and demonstrate that there are no other suitable alternatives.
- Vegetation or forest management will be utilized only to preserve and enhance identified resource features and landscapes.

Zone 2

General Description

This Zone includes areas containing typical yet important natural and cultural resources on which common forestry practices and dispersed recreational activities can be practiced at sustainable levels that do not degrade these resources and that hold potential for improving their ecological health, productivity and/or protection through active management. Examples include terrestrial and aquatic ecosystems characterized by a diversity of wildlife and plant habitats, rare species habitat that is compatible with sustainable forestry and dispersed recreation, agricultural resources, and resilient cultural sites and landscapes. Zone 2 areas may be actively managed provided that the management activities are consistent with the approved Resource Management Plan for the property.

General Management Guidelines

- Management approaches and actions may include a wide range of potential recreational opportunities and settings that are consistent and compatible with natural resource conservation and management goals.
- Utilize Best Management Practices for forestry and other resource management activities to encourage native biodiversity, protect rare species habitats and landforms.
- Protect and maintain water quality by providing for healthy functioning terrestrial and aquatic ecosystems.
- Provide a safe, efficient transportation network with minimal impact on natural and cultural resources while serving public safety needs and allowing visitors to experience a variety of outdoor activities.
- New trails may be allowed dependent upon existing area trail densities, purpose and need, physical suitability of the site, and specific guidelines for protection of rare species habitat and archaeological resources.
- Sustainable forest management activities may be undertaken following guidelines established through ecoregion-based assessments, district level forestry plans, current best forestry management practices, and providing for consistency with resource protection goals.
- Roads may be constructed if access for resource management or public access is needed and construction can be accomplished in an environmentally protective manner. Existing roads will be maintained in accordance with the DCR road classification system and maintenance policy.
- Additional site-specific inventory and analysis may be needed prior to any of the management activities described above to ensure that no adverse impacts occur to previously un-documented unique and sensitive resources and landscape features.

Zone 3

General Description

This zone includes constructed or developed administrative, maintenance and recreation sites, structures and resilient landscapes which accommodate concentrated use by recreational visitors and require intensive maintenance by DCR staff. Examples include areas developed and deemed appropriate for park headquarters and maintenance areas, parking lots, swimming pools and skating rinks, paved bikeways, swimming beaches, campgrounds, playgrounds and athletic fields, parkways, golf courses, picnic areas and pavilions, concessions, and areas assessed to be suitable for those uses.

General Management Guidelines

- The management approach and actions will emphasize public safety conditions and provide for an overall network of accessible facilities that meets the needs of DCR visitors and staff.
- Maintenance of these facilities and associated natural and cultural resources, and new construction or development, will meet state public health code, and state building code and environmental regulations.
- Shorelines and surface waters may be used for recreation within constraints of maintaining public safety and water quality.
- Historic restoration, rehabilitation or reconstruction for interpretation or adaptive reuse of historic structures will be undertaken only in conjunction with a historic restoration plan.
- To the greatest extent possible, construction will include the use of "green design" for structures, such as use of low-flow water fixtures and other water conservation systems or techniques, solar and other renewable energy sources, and the implementation of Best Management Practices to protect the soil and water resources at all facilities.

Significant Feature Overlays

General Description

The three land stewardship zones may be supplemented with significant feature overlays that identify specific designated/recognized resource features. These significant features are generally identified through an inventory process or research, and are formally designated. The purpose of these overlays is to provide more precise management guidance for identified resources and to recognize, maintain, protect, or preserve unique and significant values, regardless of the zone in which they occur. Examples of significant feature overlays include Forest Reserves, areas subject to public drinking water regulations, or areas subject to historic preservation restrictions.

Management Guidelines

Specific management guidelines for significant features overlays are provided by resource specialists or by the Federal/state/regional/local agency that has recognized and listed the resource or site.

E: Waquoit Bay ACEC Designation Document

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

EDWARD J. KING
GOVERNOR

JOHN A. BEWICK
SECRETARY

Designation of Waquoit Bay as an
Area of Critical Environmental Concern
and Supporting Findings

Following an extensive process, including nomination, research, informal meetings with local groups, public informational meetings, public hearings, on-site visits, and a formal evaluation of all assembled data, I, the Secretary of Environmental Affairs, hereby designate Waquoit Bay an Area of Critical Environmental Concern pursuant to the authority granted to me by G.L. c. 21A, s. 2(7).

I also hereby, find that the Waquoit Bay ACEC is significant to flood control, the prevention of storm damage, the protection of land containing shellfish and fisheries; public interests protected by the Wetlands Protection Act, G.L. c. 131, §40.

1. Boundary of the Waquoit Bay ACEC

The Area of Critical Environmental Concern (ACEC) extends from the extreme southwestern end of Dead Neck barrier beach (mean low water, MLW) and extends straight across the entrance channel to Waquoit Bay by the shortest distance to the mean low water line of the western side of the entrance channel. The ACEC boundary then follows the MLW line in a westerly direction (excluding the western jetty of the Waquoit Bay entrance channel) to a point approximately 1370 feet (straight line measure) from the westernmost tip of Washburn Island. This point falls on a line perpendicular to the MLW line of Vineyard Sound and tangent to a segment of shoreline which is both the southeast MLW shoreline of Eel Pond and a western edge of Washburn Island.

The ACEC boundary then follows that perpendicular line to the intersection with the western MLW shore of Washburn Island. The boundary follows the MLW line along the Washburn Island to its extreme northeastern point. The boundary then extends from this point north into Waquoit Bay by the shortest distance to the 6 foot depth curve (datum: MLW). The boundary follows the 6 foot depth curve in a northerly direction to the point of intersection with a true azimuth bearing line of 150°, drawn from the southwestern most point of shoreline of the un-named pond east of Seapit Road. From this point of intersection the ACEC boundary then follows this above-mentioned bearing line in a northwesterly direction to the southwestern most point of shoreline of the un-named pond east of Seapit Road and continues along an extension of this straight line to the intersection with the 100 year flood boundary still east of Seapit Road.

The ACEC boundary then follows the 100 year flood boundary in a generally easterly direction including all of Bourne Pond, Bog Pond, Caleb Pond, parts of the Quashnet River and Red Brook and all of Witch Pond, Fells Pond, and Jehu Pond. At the point of the fifth intersection of the 100 year flood boundary with Great Oak Road, the ACEC boundary extends west on the northern side line of Great Oak Road across the 10 foot contour line (datum: mean sea level) to the second intersection with the 10 foot contour line (MSL). The ACEC boundary extends from this point in a northwesterly direction along the 10 foot contour line (MSL) to the point closest to the eastern shore (MLW) of the Great River. From this point the line extends by the shortest distance to the eastern shore (MLW) of the Great River. The boundary then extends in a northerly direction along the eastern shore (MLW) of the Great River to the western most point of the entrance channel to Jehu Pond. The boundary then extends due west to the MLW line on the west side of Great River and following the MLW line northward to the boundary between Monomoscoy Island and the adjacent northerly salt marsh. The boundary follows a northwesterly trend along the southern edge of this salt marsh, crosses Monomoscoy Road, and continues along the southern edge of this salt marsh to the intersection with the MLW line on the eastern side of Hamblin Pond. The boundary continues in a southerly direction along the MLW line on the east side of Hamblin Pond, across the northern channel entrance of the Little River and continues along the MLW line on the northern edge of Seconsett Island to the intersection of the MLW line and the town boundary between Falmouth and Mashpee. The ACEC boundary follows the town boundary to the intersection with the MLW line on the eastern shore of Waquoit Bay. The ACEC boundary extends from this point in a southerly direction along the MLW line, around Seconsett Island and then in a northerly direction to the point of intersection (Point A) with a true azimuth bearing line of 290°, drawn from the point (Point B) along the MLW line on the eastern shore of the Great River which is also the northernmost point (Point B) of property along the MLW line on the eastern shore of the Great River as described in the Plan of Land, South Cape Beach, Mashpee, Mass., prepared for the Department of Environmental Management, Scale 1"=200', February 16, 1976, Briggs Engineering and Testing Co., Inc., Norwell, Mass., as revised March 31, 1976. The ACEC boundary then proceeds southeasterly from Point A along the previously described true azimuth bearing line of 290° to Point B and continues in an easterly direction along the northern boundary line of said Plan of Land for South Cape Beach to the intersection with the southern side line of Wills Work Road. The ACEC boundary follows the southerly side line of said Road to the intersection with Great Oak Road and then follows the southerly side line of Great Oak Road to the intersection with 100 year flood boundary. The ACEC boundary follows the 100 year flood boundary in a northeasterly direction to the intersection of the southerly side line of Great Oak Road. The ACEC boundary then follows the southerly side line of said Road to the next intersection with the 100 year flood boundary. From this point, the ACEC boundary follows the 100 year flood boundary in a southerly direction to the southernmost extent of the 100 year flood boundary in Mashpee. The boundary then extends due south in a straight line to the MLW line of Vineyard Sound and thence in a westerly direction along the MLW line along South Cape Beach to the point of origin.

Also included within the ACEC boundary is the land along the upper reaches of the Child's River. The ACEC boundary begins at the intersection of the northerly side line of Rt. 28 and the 100 year flood boundary on the eastern side of the Childs River. The ACEC boundary proceeds northerly along the 100 year flood boundary on the eastern side of the Childs River to the point where the 100 year flood boundary crosses in a westerly direction the Childs River. The ACEC boundary then follows the 100 year flood boundary on the western side of the Childs River in a southerly direction to the point of intersection with the northern side line of Rt. 28. The ACEC boundary then proceeds from this point in an easterly direction across the Childs River to the point of origin.

Within the boundary the following exclusions exist:

1) The existing Waquoit Bay navigational channel (6 foot depth, Mean Low Water) extending in a northerly direction from the entrance jetties of Waquoit Bay to the head of Waquoit Bay. Specifically, this meas the channel delineated by existing U.S. Coast Guard buoys (See National Oceanic and Atmospheric Administration, nautical chart #13229, 15th Ad., February 3, 1979, page C, Waquoit Bay and U.S. Coast Guard navigational buoys). Where the channel is unmarked by buoys, the west channel boundary will be delineated by a straight line drawn from buoy C-7 northerly to the western edge of Bourne Pond. This channel would extend no further than 100 feet to the east of the west channel boundary and not exceed a dredged depth of 6 feet below mean low water. This channel will extend no further north than the present Falmouth town landing (near Seapit Road).

2) The existing Seconsett navigational channel extending from U.S. Coast Guard buoy N-6 (see NOAA nautical chart #13229, 15th Ad., February 3, 1979, page C, Waquoit Bay and U.S. Coast Coast navigational buoys) to the entrance of the Great and Little Rivers, Mashpee. The southern boundary of the Seconsett channel extends from buoy N-6, southeasterly in a direct line not to extend beyond Seconsett point. The width of the Seconsett channel will not exceed 100 feet from the southern boundary line. The Seconsett channel will not exceed a dredged depth of 6 feet below MLW.

3) The existing small culvert beneath Monomoscoy Road, Mashpee.

II. Designation of the Resources of Waquoit Bay

Waquoit Bay area is an extensive and largely unaltered resource system. Among the natural components of the system are many specified as Significant Resource Areas (SRA's) in the Massachusetts CZM Program. These include a long barrier beach system, dunes and sandy beaches, many acres of salt marsh, productive shellfish beds, a large estuary, anadromous fish runs and floodplain, erosion and accretion areas. The area is a spawning and nursery ground for many marine species, as well as an important habitat for upland species and waterfowl. The beaches, dunes, and salt marshes provide protection against storms for low-lying inland areas. The region clearly meets the regulatory criterion of the ACEC Program, that a region proposed for designation must contain at least five of the specified Significant Resource Areas.

III. Procedures Leading to ACEC Designation

The Waquoit Bay Area was first proposed for ACEC consideration by local citizens at a CZM planning meeting over two years ago. Active planning commenced in March 1979. Meetings on May 3, May 24, and August 2 were held in Falmouth and Mashpee and attended by local officials and local planning boards, committee members, owners of the area's three marinas and some property owners.

On August 2 a proposed boundary was unanimously endorsed by the six officials and marina owners present at this meeting. On July 9, 1979, a letter nominating the Waquoit Bay Estuarine System as an Area of Critical Enviornmental Concern was submitted by the Selectmen, Conservation Commission and Waterways Committee/ Harbormaster of the Towns of Falmouth and Mashpee. After reviewing this nomination, the Secretary of Environmental Affairs decided, on August 21, 1979 to proceed with a full review of the proposed area.

Notice of the receipt of the nomination request and a public hearing notice were published in the Environmental Monitor on August 22, 1979. The public hearing notice also appeared in two local newspapers: The Cape Cod Times and The Falmouth Enterprise. Additional information on the region was collected by the Coastal Zone Management office staff in consultation with local officials, town boards and natural resource officers. The results of this research were forwarded for comment and review to the Selectmen, Conservation Commissions, Planning Boards, Waterways Committee, and Natural Resource Officers and members of the CZM Citizen Advisory Council for Cape Cod. Copies also went to interested individuals and were available to the general public upon request. Informational articles about the proposed nomination appeared in the local newspaper. A final informational meeting was held at Mashpee Town Hall on August 30, 1979.

A public hearing was conducted on September 27, 1979 in the Falmouth Town Hall. The recorded testimony was largely favorable and an informal vote was 50-3 in favor of the designation. As the result of a number of concerns raised at this meeting, on-site visits were also arranged. On October 19, eighteen citizens and officials toured Waquoit Bay by boat following existing main navigational channels. In addition, CZM staff conducted site visits with individual landowners who had concerns.

A second public hearing was scheduled for October 25, 1979. A public hearing notice was published in the Environmental Monitor on October 22, 1979. The public hearing notice also appeared in the Cape Cod Times and The Falmouth Enterprise.

The hearing record remained open until November 7, 1979 for those persons who wished to submit written comments. After careful consideration of all public comments, final boundary modifications were defined.

IV. Discussion of Factors Specified in Section 6.48 of the CZM Program Regulations

Prior to designation of a region as an Area of Critical Environmental Concern, the Secretary must consider the factors specified in Section 6.48 of the CZM Program regulations. Based on research and information from local residents, I find that the following factors are applicable to the Waquoit Bay Barrier Beach System.

Quality of Natural Characteristics: This estuarine system is a relatively large unaltered physical and biological resource. Its unpolluted water attracts a wide range of finfish species and nurtures large numbers of shellfish. The undeveloped stretches of Washburn Island and Dead Neck accommodate contiguous environments of beach, dune, marsh, and low wooded hills. Minimum alteration of the natural features of this area will allow them to function at their maximum capacity. These undeveloped expanses also contribute significantly to the scenic beauty enjoyed by users of the area.

Public Health: The high water quality currently existing supports many important activities, including swimming, boating, fishing and shellfishing. Clean water must be maintained to ensure the safety of the recreational users of the area. Activities that would degrade water quality would have both environmental and economic consequences. The barrier beach formed by Washburn Island and Dead Neck acts as a natural storm buffer to protect the property of shore dwellers within the system. Development of this barrier would impair its natural form and protective function.

Uniqueness: An estuary, where fresh water inflow meets and mixes with salt water, is the most significant of all coastal features in the amount and variety of biological production. The largely unaltered Waquoit Bay estuarine system makes this area both a highly significant and uncommon feature of the Massachusetts coast. The availability of nutrients supports a great number and variety of species. These conditions provide excellent opportunities for scientific research. In a study conducted in the late 1960's, the Massachusetts Division of Marine Fisheries determined that of nine sample estuaries in the state, Waquoit Bay supported the greatest diversity of estuarine-associated fin-fish. Currently, a biologist from the Woods Hole Oceanographic Institution is studying the genetics and distribution of quahogs in the estuary.

Productivity: The region contains diverse and viable populations of fish, shellfish and waterfowl. The biological productivity of this area is sustained by its ponds and salt marshes which contribute large quantities of nutrients to the coastal food chain.

Imminence of Threat to the Resource: Alterations which could severely impact the natural functions or reduce productivity of the components of the Waquoit Bay system have been considered for the area. The ACEC designation would focus attention on the area's significant environmental and economic resources, and would serve as a guide regarding future activity in the area.

Irreversibility of Impact: Because the estuary has only limited access to the open Sound through the narrow cuts at the east end of Washburn Island, the entire basin is susceptible to inadequate flushing. The discharge of pollutants into this system would tend to remain concentrated rather than to disperse. As a result, impacts on shellfish and finfish could be severe, thereby damaging an important economic resource of the Waquoit basin. Other habitat alterations such as filling or removal could also severely affect sensitive spawning or nursery areas, thereby decreasing the abundance of valuable commercial, recreational, and aesthetic resources.

Economic Benefits: This ACEC brings significant income to Falmouth and Mashpee through tourists and area residents who purchase shellfish permits, the use of area services such as boatyards, and the wholesale trade in shellfish. Any alteration in the area that threatens to disrupt its utilization and/or attractiveness carries a potentially detrimental economic impact. Damage to the groundwater is also an important consideration because the shore-dwellers depend on private groundwells for their fresh water supply.

Supporting Factors: Residents, business persons and other users of the ACEC agree that the area carries environmental importance, economic utility and aesthetic qualities. Groups at many levels, including local residents, town authorities and state administrative agencies, have voiced their concern about the need to preserve the undeveloped portions, particularly Washburn Island and South Cape Beach.

John A. Bewick
Secretary of Environmental Affairs

11/26/79
Date

F: Waquoit Bay ACEC Resource Summary

Summer, 2003

Waquoit Bay
Area of Critical Environmental Concern (ACEC)

Designation Date: November 26, 1979
Total approximate acreage: 2,575 acres
Watershed/subwatershed: Cape Cod/Waquoit Bay
Municipalities (% of ACEC): Falmouth (48%) and Mashpee (52%)

What makes this area so special?

Designated Habitats

The Waquoit Bay ACEC was nominated by the Conservation Commissions, Boards of Selectmen, and Waterways Committees in the Towns of Mashpee and Falmouth and was designated as an ACEC in 1979 because of the area's extraordinary natural resources. The ACEC boundary generally follows the 100-year floodplain elevation on the landward side of the Bay and mean low water on the seaward side and includes the Waquoit Bay National Estuarine Research Reserve (WBNERR). The entire bay is designated by the state as an Ocean Sanctuary while much of the surrounding upland is also part of the Mashpee National Wildlife Refuge. Important habitats within the boundary include estuarine waters, freshwater wetlands and ponds, shrub and wooded swamps, streams, salt marsh, tidal flats, coastal dunes, and beaches. These areas provide flood control, storm damage prevention, improved water quality, wildlife habitat, and recreation opportunities to surrounding communities.

Wildlife

The diverse and relatively unaltered habitats of this ACEC provide feeding, spawning, and nursery grounds for numerous shellfish, finfish, amphibians, reptiles, birds, and mammals. In 2002, the state's Natural Heritage and Endangered Species Program (NHESP) identified approximately 500 acres or 20 % of the ACEC as core habitat through their BioMap project that highlights areas in Massachusetts with high biodiversity and most in need of protection. That same year, NHESP listed 7 species that were either Endangered (E), Threatened (T) or of Special Concern (SC), including: the Shortnose Sturgeon (E- fish), Mattamuskeet Panic-Grass (E-plant), Diamondback Terrapin (T - reptile), Piping Plover (T- bird), Least Tern (SC- bird), New England Blazing Star (SC-plant), and Bristly Foxtail (SC – plant). American eel, rainbow smelt, blueblack herring, striped bass, trout, and white perch have also been sited in the area. In 2001, the NHESP also certified one vernal pool and located 6 potential vernal pools in this ACEC.

The Quashnet River, which stretches from the Bay to John's Pond in Mashpee, is an important migratory fish run for alewife and trout and is the site of successful restoration efforts. Habitat for soft shell clams, bay scallops, and quahogs can be found within the ACEC boundary according to draft maps made in 2003 by the Division of Marine Fisheries and based on historical information and interviews with local shellfish officers.

Land Use

One quarter of the land within the Waquoit Bay ACEC boundary is forested while approximately 15% of the area is covered by freshwater wetland or salt marsh habitats. The majority of the 770

acres or approximately 30% of the ACEC that is protected open space is owned by the state's Department of Environmental Management and includes Washburn Island and South Cape Beach State Park. Although only 70 acres of land within the boundary has been converted to residential development, a large portion of the land immediately adjacent to the ACEC has a mix of residential areas, especially in the densely developed Seacoast Shores on the west side of the Bay. Because of the high proportion of development near the ACEC, sources of nitrogen entering local waterways from septic systems and lawn fertilizers and their effects on such things as eelgrass beds are being studied by stewardship groups working in the region.

Economy

The economies of Falmouth and Mashpee are tied to this area since local fishing and tourism industries depend on the natural resources in this ACEC. Rich shellfish populations, including soft shell clams, quahogs, and bay scallops, are an important part of the recreational and commercial fishing industry in the Bay. In 2002, tidal areas in the ACEC supported 22 acres of aquaculture lease sites used by one license holder. Residents and tourists are also drawn to the clean waters and beaches for recreational activities such as boating, swimming, walking, and bird watching. Public access is provided at WBNERR and on the town and state owned South Cape Beach.

Archaeology

"Waquoit" is the Wampanoag name used by the Mashpee tribe who originally settled here. The Waquoit Bay ACEC contains nine archaeological sites, with four sites on Washburn Island alone. However, this number greatly underestimates the significant archaeological record around Waquoit Bay because many sites are lumped together on Washburn Island. One discovery of undated human remains from the Island was identified as that of a 30-year-old Native American female, while arrowhead and shellheap evidence can still be found in the area. Although limited, available information suggests that Waquoit Bay was first occupied 9,000 - 8,000 years ago.

Stewardship

One goal of the ACEC program is to promote stewardship of this area's resources through the participation, cooperation, and expertise of many interest groups. The Waquoit Bay National Estuarine Research Reserve provides long-term protection of habitats and natural resources, serves as a natural laboratory for research, and promotes outreach and training activities. The Reserve works with partners to explore solutions to coastal management issues and transfers the information learned to the public and coastal decision makers in the region.

There have been numerous studies, restoration projects, and water quality monitoring conducted by a variety of groups in Waquoit Bay. A collaborative effort between Trout Unlimited and the Massachusetts Department of Fish and Wildlife is helping to restore the Quashnet River and has resulted in a self-sustaining brook trout population. Important studies are investigating the effects of nutrient loading and eutrophication of Bay waters. Other studies have focused on the loss of eelgrass beds, protection of drinking supplies, pathogens in the water, erosion of the coastline and barrier beaches, protection of endangered species, and ecological impacts of boats, docks, and piers.

The Quashnet River, Hamblin Pond, and Jehu Pond were selected in 2001 as priority waterbodies for the *Estuaries Project - Southeastern Massachusetts Embayment Restoration* conducted with collaboration of state agencies, academic institutions, and local municipalities. The goal of the Estuaries Project is to classify the nitrogen sensitivity of southeastern Massachusetts's coastal bays and estuaries. This study will result in the generation of planning and policy guidance

documents to help the communities of Waquoit Bay consider how to improve water quality by implementing nitrogen management strategies.

By becoming active stewards, community members can help monitor the condition, target problems, and find ways to improve and protect the natural resources in their ACEC. If you have any questions or ideas for stewardship in the Waquoit Bay ACEC, please contact the Massachusetts Office of Coastal Zone Management's ACEC Stewardship Coordinator, Katie Lund, at (508) 289-2889 or the Department of Environmental Management's ACEC Coastal Coordinator, Liz Sorenson, at (617) 626-1394. Also see the ACEC website, http://www.mass.gov/dem/programs/acec and WBNERR website, http://www.waquoitbayreserve.org.

Who are local ACEC stewards?
Waquoit Bay National Estuarine Research Reserve (WBNERR)
WBNERR volunteers
Citizens for the Protection of Waquoit Bay
Waquoit Bay Watchers
Waquoit Association
Falmouth Associations Concerned with Estuaries and Saltponds (FACES)
Trout Unlimited
Coonamessett River Park Coalition

What coastal resources are included (partially or entirely) in the ACEC?

Harbors, Sounds, Bays: Waquoit Bay (*Falmouth, Mashpee*)

Rivers: Childs River, Quashnet River *(Falmouth)*

Lakes, Ponds: Bog, Bourne, Caleb, and Hamblin Ponds *(Falmouth)*; Flat, Hamblin, Jehu, Jim, Little Flat, Sage Lot, and Witch Ponds *(Mashpee)*

Brooks, Creeks: Red Brook (*Mashpee*)

Great Ponds (ponds > 10 acres): Jim Pond *(Mashpee)*

Outstanding Resource Waters (ORWs): Waquoit Bay and Hamblin Pond (*Falmouth, Mashpee*); Childs River, Quashnet River, Bog, Bourne, and Caleb Ponds *(Falmouth)*; Flat, Hamblin, Jehu, Jim, Sage Lot, and Witch Ponds, Red Brook (*Mashpee*). *(ORWs are waters, such as public water supplies and vernal pools that are protected by the most stringent standards because they constitute an outstanding resource as determined by their socio-economic, recreational, ecological, and/or aesthetic values).*

Barrier Beaches included in ACEC (Massachusetts Barrier Beach Inventory, CZM, 1982): *in Falmouth - on Washburn Island:* beach to west of bay inlet (Fm-1), beach to east of Eel Pond Inlet (Fm-11), areas fronting marshes on east side of island (Fm-7,8,9), beach on west side of island opposite Bayview Drive (Fm-10); *within Waquoit Bay:* mouth of Quashnet River (Fm-3,4), area fronting Caleb Pond (Fm-5), fronting pond south of Waquoit cemetery (Fm-6), fronting Hamblin Pond (Fm-2); *in Mashpee:* South Cape Beach/Dead Neck (Ms-5), beach fronting Flat Pond (Ms-9)

NATURAL RESOURCE ACREAGE ESTIMATES

Note: acreages are estimated using Massachusetts Geographic Information System data (2001).

HABITAT TYPE	ACREAGE in ACEC	% of ACEC	LAND USE	ACREAGE in ACEC	% of ACEC
barrier beach	135	5	recreation	105	4
eelgrass	100	4	agriculture	--	--
salt marsh	280	11	residential	72	3
tidal flat	6	<1	commercial	--	--
freshwater wetland	155	6	industrial	<1	<1
cranberry bog	30	1			
forest	665	26			
open water	1,227	48			
100 yr floodplain	2,105	79			

G: Waquoit Bay ACEC Legal Boundary Description

The Waquoit Bay Area of Critical Environmental Concern (ACEC) boundary is defined as follows: the ACEC extends from the extreme southwestern end of Dead Neck barrier beach (mean low water, MLW)

CONNECTING LINE	and extends straight across the entrance channel of Waquoit Bay by the shortest distance to the mean low water line of the western side of the entrance channel.
MLW	The ACEC boundary then follows the MLW line in a westerly direction (excluding the western jetty of the Waquoit Bay entrance channel) to a point approximately 1370 feet (straight line measure) from the westernmost tip of Washburn Island. This point falls on a line perpendicular to the MLW line of Vineyard Sound and tangent to a segment of shoreline which is both the southeast MLW shoreline of Eel Pond and a western edge of Washburn Island.
CONNECTING LINE	*The ACEC boundary then follows that perpendicular line to the intersection with the western MLW shore of Washburn Island.*
MLW	*The boundary follows the MLW line along the Washburn Island to its extreme northeastern point.*
CONNECTING LINE	*The boundary then extends from this point northerly into Waquoit Bay by the shortest distance to the 6 foot depth curve (datum: MLW).*
6 FOOT DEPTH CURVE	*The boundary follows the 6 foot depth curve in a northerly direction to the point of intersection with a true azimuth bearing line of 150°, drawn from the southwestern most point of shoreline of the un-named pond east of Seapit Road.*
CONNECTING LINE	*From this point of intersection the ACEC boundary then follows this above-mentioned bearing line in a northwesterly direction to the southwestern most point of shoreline of the un-named pond east of Seapit Road and continues along an extension of this straight line to the intersection with the 100 year flood boundary still east of Seapit Road.*
FLOODPLAIN	*The ACEC boundary then follows the 100 year flood boundary (floodplain definitions are based on the most currently available Flood Insurance Rate Maps from the Federal Emergency Management Agency) in a generally easterly direction including all of Bourne Pond, Bog Pond, Caleb Pond, parts of the Quashnet River and Red Brook and all of Witch Pond, Fells Pond, and Jehu Pond.*
ROAD	At the point of the fifth intersection of the 100 year flood boundary with Great Oak Road, the ACEC boundary extends west on the northern side line of Great Oak Road across the 10 foot contour line (datum: mean sea level) to the second intersection with the 10 foot contour line (MSL).
10 FOOT CONTOUR	

CONNECTING LINE	The ACEC boundary extends from this point in a northwesterly direction along the 10 foot contour line (MSL) to the point closest to the eastern shore (MLW) of the Great River.
MLW	From this point the line extends by the shortest distance to the eastern shore (MLW) of the Great River.
CONNECTING LINE	The boundary then extends in a northerly direction along the eastern shore (MLW) of the Great River to the western most point of the entrance channel to Jehu Pond.
MLW	The boundary then extends due west to the MLW line on the west side of Great River
WETLAND	*and following the MLW line northward to the boundary between Monomoscoy Island and the adjacent northerly salt marsh.*
CONNECTING LINE	*The boundary follows along the southern edge of this salt marsh until it*
WETLAND	*crosses Monomoscoy Road at the southern edge of the culvert,*
MLW	
CONNECTING LINE	*and continues along the southern edge of this salt marsh to the intersection with the MLW line on the eastern side of Hamblin Pond.*
MLW	The boundary continues in a southerly direction along the MLW line on the east side of Hamblin Pond,
TOWN LINE	connecting across the northern channel entrance of the Little River,
MLW	and continues along the MLW line on the northern edge of Seconsett Island to the intersection of the MLW line and the town boundary between Falmouth and Mashpee.
	The ACEC boundary follows the town boundary to the intersection with the MLW line on the eastern shore of Waquoit Bay.
CONNECTING LINE	The ACEC boundary extends from this point in a southerly direction along the MLW line, around Seconsett Island and then in a northerly direction to the point of intersection (Point A) with a true azimuth bearing line of 290°, drawn from the point (Point B) along the MLW line on the eastern shore of the Great River which is also the northernmost point (Point B) of property along the MLW line on the eastern shore of the Great River as described in the Plan of
PROPERTY LINE	

ROAD — Land, South Cape Beach, Mashpee, Mass., prepared for the Department of Environmental Management, Scale 1"=200', February 16, 1976, Briggs Engineering and Testing Co., Inc., Norwell, Mass., as revised March 31, 1976.

FLOODPLAIN — The ACEC boundary then proceeds southeasterly from Point A along the previously described true azimuth bearing line of 290° to Point B

CONNECTING LINE — and continues in an easterly direction along the northern boundary line of said Plan of Land for South Cape Beach to the intersection with the southern side line of Wills Work Road.

MLW — The ACEC boundary follows the southerly side line of said Road to the intersection with Great Oak Road and then follows the southerly side line of Great Oak Road to the intersection with 100 year flood boundary.

From this point, the ACEC boundary follows the 100 year flood to the southernmost extent of the 100 year flood boundary in Mashpee.

The boundary then extends due south in a straight line to the MLW line of Vineyard Sound

and thence in a westerly direction along the MLW line along South Cape Beach to the point of origin.

Also included within the ACEC boundary is the land along the upper reaches of the Child's River. The ACEC boundary begins at the intersection of the northerly side line of Rt. 28 and the 100 year flood boundary on the eastern side of the Childs River.

FLOODPLAIN — The ACEC boundary proceeds northerly along the 100 year flood boundary on the eastern side of the Childs River to the point where the 100 year flood boundary crosses the Childs River in a westerly direction. The ACEC boundary then follows the 100 year flood boundary on the western side of the Childs River in a southerly direction to the point of intersection with the northern side line of Rt. 28.

ROAD — The ACEC boundary then proceeds from this point in an easterly direction across the Childs River to the point of origin.

Within the boundary the following exclusions exist:

1) The existing Waquoit Bay navigational channel (6 foot depth, Mean Low Water) extending in a northerly direction from the entrance jetties of Waquoit Bay to the head of Waquoit Bay. Specifically, this means the channel delineated by existing U.S. Coast Guard buoys (See National Oceanic and Atmospheric Administration, nautical chart 13229, 15th Ad., February 3, 1979, page C, Waquoit Bay and U.S. Coast Guard navigational buoys). Where the channel is unmarked by buoys, the west channel boundary will be delineated by a straight line drawn from buoy C-7 northerly to the western edge of Bourne Pond. This channel would extend no further than 100 feet to the east of the west channel boundary and not exceed a dredged depth of 6 feet below mean low water. This channel will extend no further north than the present Falmouth town

landing (near Seapit Road).

2) The existing Seconsett navigational channel extending from U.S. Coast Guard buoy N-6 (see NOAA nautical chart #13229, 15th Ad., February 3, 1979, page C, Waquolt Bay and U.S. Coast Coast navigational buoys) to the entrance of the Great and Little Rivers, Mashpee. The southern boundary of the Seconsett channel extends from buoy N-6, southeasterly in a direct line not to extend beyond Seconsett point. The width of the Seconsett channel will not exceed 100 feet from the southern boundary line. The Seconsett channel will not exceed a dredged depth of 6 feet below MLW.

3) The existing small culvert beneath Monomoscoy Road, Mashpee.

Where ACEC boundaries are defined by the location of natural resource features (e.g. floodplain, wetlands), the boundaries are subject to change based on the most current definitions and data. For a review of site specific projects within the ACEC boundary, determinations need to be made in the field or in consultation with ACEC Program staff.

Coastal ACEC Boundary Clarification Project, November 2002.

H: WBNERR Land Acquisition Plan: 2006-2011

Introduction

Purpose

The WBNERR Land Acquisition Plan documents a strategy to acquire interest (fee simple or easement) in key land parcels in proximity to the Reserve boundary that provide one or more of the following values:

- Resource protection for terrestrial resources,
- Resource protection for aquatic/estuarine resources,
- Access for research,
- Access for education programs,
- Sites for stewardship demonstrations,
- Locations for potential research/education facilities, and/or
- Access for passive coastal recreation.

The Reserve will pursue acquisitions independently and in partnership with other organizations.

Overview of WBNERR

Waquoit Bay National Estuarine Research Reserve, located in the towns of Falmouth and Mashpee in Massachusetts, was formally established in June 1998. It is composed of open waters, barrier beaches, sand dunes, fresh and salt marshes, rivers, and mixed pine and oak forests. The more than 2,700 acres of aquatic and terrestrial habitat in the Reserve are representative of the New England portion of the Virginian biogeographic province.

The Reserve is guided by the following mission, vision, and goal statements:

> **Mission:** To improve the stewardship of the region's estuarine and coastal watershed ecosystems.
>
> **Vision**: To be recognized as a vital regional resource for expertise on sustainable coastal management provided through integrated programs of coastal ecosystem research and monitoring; management and stewardship; and education and training aimed at coastal communities, organizations, and individuals.
>
> **Goals:**
>
> 1. Improve the understanding of coastal ecosystems and the human influences on them.
>
> 2. Improve environmental literacy in our communities to enable environmentally-sustainable decision-making.

3. Demonstrate sustainable stewardship of the land and water ecosystems within the Reserve to serve as a model for community stewardship in the region.

4. Foster dialogue and development of coastal ecosystem management solutions through sustained community engagement.

5. Improve the operations, infrastructure and stature of the Reserve.

The Reserve's primary activities are organized into three program areas: research and monitoring, training and education, and stewardship. All of the programs address the themes of water quality/eutrophication, climate change/renewable energy, and coastal ecosystem management. The program areas are supported by the Reserve's administrative and maintenance functions. Presently, there are thirteen full-time positions, two job-sharing positions, and six categories of seasonal employees. The actual number of seasonal employees changes annually based on funding.

Local Real Estate Market

Cape Cod is one of the nation's major resorts, located 75 miles from Boston and Providence and 250 miles from New York City. WBNERR is located in two towns, Falmouth and Mashpee, with roots dating back to the seventeenth century. Today, both towns are becoming increasingly more developed. In fact, they are two of the most rapidly growing towns in Massachusetts. Undeveloped land in the area is rapidly disappearing as the once rural landscape becomes suburbanized. Developable parcels greater than 100 acres no longer exist in the vicinity of Waquoit Bay and its watershed. In fact, there are only a few examples of developable parcels of greater than 30 acres. Most unprotected, undeveloped land remaining in the area is in parcels of two to thirty acres and many of these pieces are already, or are in the process of being, subdivided.

The decreasing regional supply of developable land makes land protection ever more important. The associated increase in land pricing, however, makes land protection ever more challenging. Waterfront and waterview land is almost entirely developed and remaining parcels are priced at a tremendous premium. Even inland of the water within the Waquoit Bay watershed, the demand for residential housing is driving up the price of undeveloped land. Recent market research indicates that neighborhood subdivisions with privacy and a high level of conformity support home prices in the range of $650,000 and above. The remaining undeveloped land parcels in the vicinity of the Reserve are currently highly vulnerable to this type of development. Additionally, the State of Massachusetts' Comprehensive Permit Law (known as Chapter 40 B) which allows for a relaxation of local zoning restrictions when a proposed development includes affordability restrictions on 25% of its units, enables higher housing densities that, in turn, lead to higher land values.

In the past, WBNERR has been integral in protecting large tracts of land threatened by conversion to residential developments. The Reserve's land preservation efforts have created the regionally unique environment that exists today for research, education, stewardship and

recreation. WBNERR's role in land acquisition is changing with the changing regional real estate market. There are few opportunities for large parcel protection that match the high profile successes of the past. A variety of opportunities exist, however, to protect important resource values and provide sites for enhanced research, education and stewardship activities through the acquisition of certain smaller parcels in the area. This plan describes the strategy for identifying parcels for acquisition by WBNERR.

Boundary Change

Despite the very challenging real estate market, the Reserve has gained title to five properties since the last management plan was written. These properties, listed below, are being incorporated into the Reserve boundary with this management plan (refer to Figure 1).

- The two Childs River properties total 22 acres and straddle the Childs River (the second largest tributary to the Bay) just upstream of tidal influence. The property includes coastal pine/oak woodland habitat and unique coastal low gradient stream habitat important to multiple migratory fish species.
- The 35 acre Abigail Brook parcel is located immediately adjacent to the easternmost portion of the Reserve in the vicinity of Upper Great River. This property includes coastal upland pine/oak woodland and important riparian buffer to the adjacent Abigail Brook and its associated wetlands.
- The 10 acre Phinney parcel is located near the Quashnet River in the central portion of the Bay's watershed. The property includes pine oak woodland characteristic of coastal uplands in the area.
- The 35 acre NStar parcel is also located near the Quashnet River in the central portion of the Bay's watershed. It is immediately adjacent to the Reserve's Quashnet River Area property and includes a variety of coastal upland and wetland habitats, including some vernal pool and freshwater wetland habitats not previously represented in the Reserve.

The Reserve has also acquired a conservation easement on about seven acres of Town of Mashpee open space land which is not being incorporated into the Reserve boundary at this time.

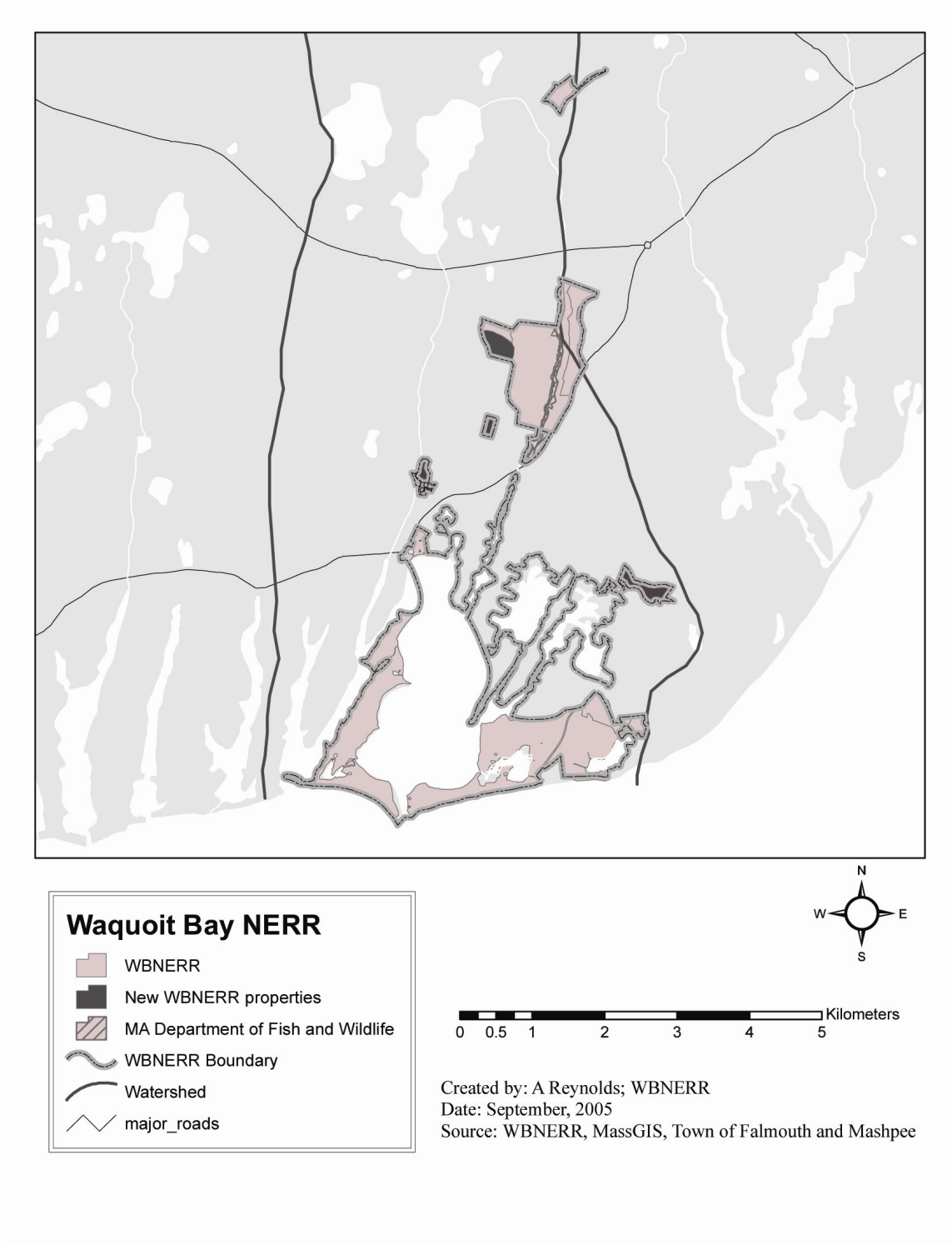
Protection of the five properties listed above prevents their future development and, thus, eliminates potential new sources of nitrogen in the Waquoit Bay estuarine ecosystem. Inclusion of these properties within the Reserve boundary adds underrepresented habitats typical of the biogeographic province, including various migratory fish runs, coastal forested uplands and freshwater wetlands. These properties also provide previously non-existing access and further opportunities for the Reserve's research and education programs.

All of these parcels have a history of rural agricultural land use. Cranberry operations existed at the Childs River and Abigail Brook parcels, while grazing was the likely historic land use at the other parcels. Agricultural operations at all sites have been abandoned for at least 30 years and vegetation succession is occurring on all of the properties.

With the inclusion of these properties into the NERR boundary, they are subject to all land and water resource management, signage and public information, law enforcement, and other site

control activities outlined in this Management Plan. Reserve led biological monitoring, including vegetation and rare species, has already begun in these areas. The habitats represented on these properties are currently being made available to research, education and stewardship demonstration activities. For example, an invasive species control project is currently underway at the Childs River property, vernal pool monitoring is occurring at the NStar property and restoration of tidal restrictions is being planned for the Abigail Brook property.

Figure 1: WBNERR Boundaries.



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